

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023
(Regular/Improvement/Supplementary)

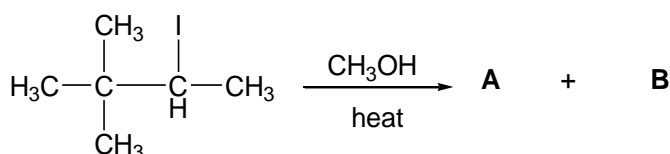
CHEMISTRY
FCHE2C07: REACTION MECHANISM IN ORGANIC CHEMISTRY

Time: 3 Hours

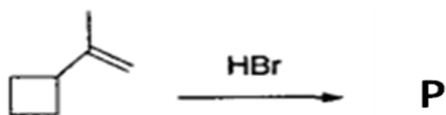
Maximum Weightage: 30

Section A: Short answer questions. Answer any *eight* questions. Each carries 1 weightage.

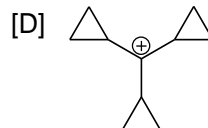
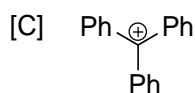
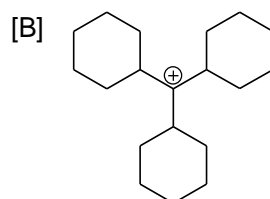
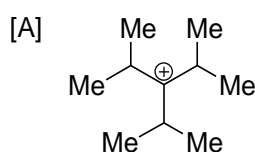
1. Identify **A** and **B** and predict the mechanism.



2. Write the reaction mechanism that involves S_E2 pathway by citing a suitable example.
 3. Explain ion-pair mechanism of nucleophilic aliphatic substitution reaction.
 4. Identify the product and write the mechanism.



5. Identify the compound having longest life-time. Justify your answer.



6. Write the reactions that involve the formation of classical and non-classical carbocation intermediate.
 7. Give two examples of the reaction involving carbene intermediate.

(P.T.O.)

8. Write a brief note on the composition of enolate formed under kinetic and thermodynamic control.
9. Explain Hoffmann-Loeffler-Freytag reactions.
10. Rationalize that the Barton reaction is an example of a remote functionalisation.
11. Illustrate how α -diazocarbonyl compound can be used to generate carboxylic acid derivatives.
12. The isomeric α -halo ketones, PhCHCl-CO-Me and PhCH₂-CO-CH₂Cl, both give the same carboxylic acid upon reaction with aq. hydroxide ion. Illustrate how the product is formed.

(8 × 1 = 8 weightage)

Section B: Short essay questions. Answer any four questions. Each carries 3 weightage.

13. Enantiomerically pure (*S*)-2-bromopropanoic acid reacts with conc. NaOH to give (*R*)-lactic acid, whereas, Ag₂O and at low conc. of NaOH fetches through retention. Explain the reason.
14. Illustrate how could *cis* and *trans*-alkenes be prepared from the same β -hydroxysilane.
15. How are singlet and triplet nitrenes generated in a reaction? How do they differ in:
i) structure and ii) energy?
16. Illustrate by citing a suitable example, what type of reaction intermediate is involved and how does this intermediate is formed during following reactions.
i) Aldol condensation; (ii) Claisen condensation and iii) Reformatsky reaction.
17. Explain the major factors that affect the stability of carbon free radicals.
18. Discuss McMurry Reaction.
19. What is pinacolone rearrangement? Write a synthetic application.

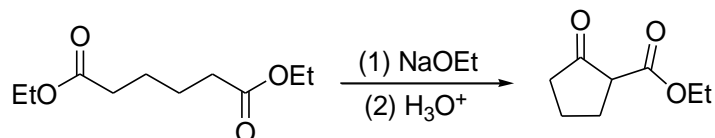
(4 × 3 = 12 weightage)

Section C: Essay questions. Answer any two questions. Each carries 5 weightage.

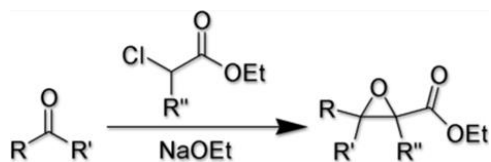
20. Discuss the factors that control the orientation and stereochemistry of C=C bond formation in E2 elimination by considering the size and nature of nucleophile and leaving group as well as structure of the substrate.
21. Write notes on the following organic reactions.
 - i) Baeyer Villiger reaction
 - ii) Dakin's reaction
 - iii) Wittig rearrangement
 - iv) Steven's rearrangement
 - v) Neber Reaction

22. Write the mechanism of the following conversions.

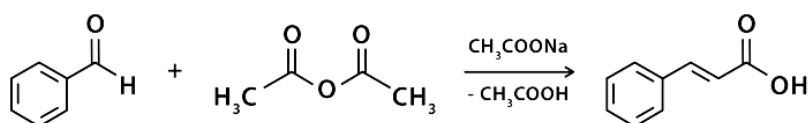
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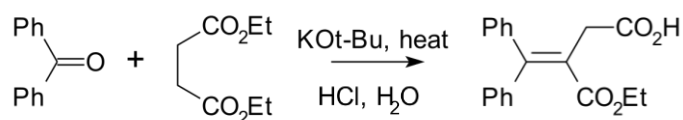
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iii)

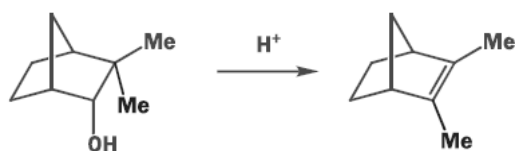


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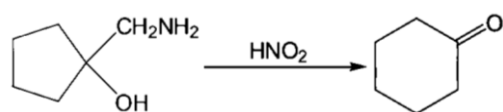


23. How will you affect the following conversions? Illustrate with mechanism.

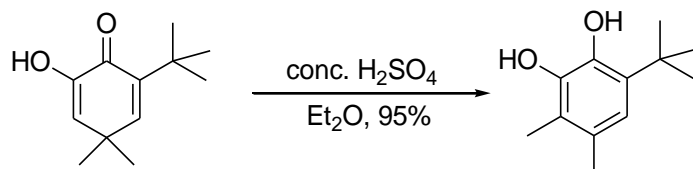
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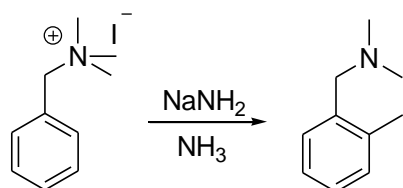
ii)



iii)



iv)



(2 × 5 = 10 weightage)